Name:

at1124exam: Radicals and Squares (v915)

Question 1

Simplify the radical expressions.

$\sqrt{27}$ $\sqrt{75}$ $\sqrt{63}$

$\sqrt{3 \cdot 3 \cdot 3}$ $\sqrt{5 \cdot 5 \cdot 3}$ $\sqrt{3 \cdot 3 \cdot 7}$

$3\sqrt{3}$ $5\sqrt{3}$ $3\sqrt{7}$

Question 2

Find all solutions to the equation below:

$$\frac{(x+6)^2 - 9}{10} = 4$$

First, multiply both sides by 10.

$$(x+6)^2 - 9 = 40$$

Then, add 9 to both sides.

$$(x+6)^2 = 49$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 6 = \pm 7$$

Subtract 6 from both sides.

$$x = -6 \pm 7$$

So the two solutions are $x = 1$ and $x = -13$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 12x = 85$$

$$x^2 + 12x + 36 = 85 + 36$$
$$x^2 + 12x + 36 = 121$$
$$(x+6)^2 = 121$$
$$x + 6 = \pm 11$$
$$x = -6 \pm 11$$
$$x = 5 \quad \text{or} \quad x = -17$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 4x^2 - 24x + 27$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 - 6x) + 27$$

We want a perfect square. Halve -6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 - 6x + 9 - 9) + 27$$

Factor the perfect-square trinomial.

$$y = 4((x-3)^2 - 9) + 27$$

Distribute the 4.

$$y = 4(x-3)^2 - 36 + 27$$

Combine the constants to get **vertex form**:

$$y = 4(x-3)^2 - 9$$

The vertex is at point $(3, -9)$.